

NuSTAR

http://www.nasa.gov/mission_pages/nustar/overview/index.html

Bringing the High-Energy Universe into Focus

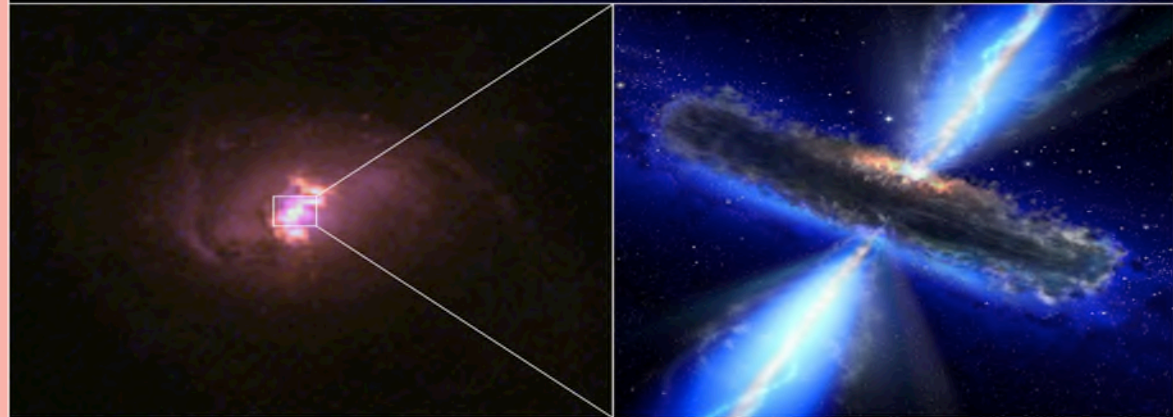
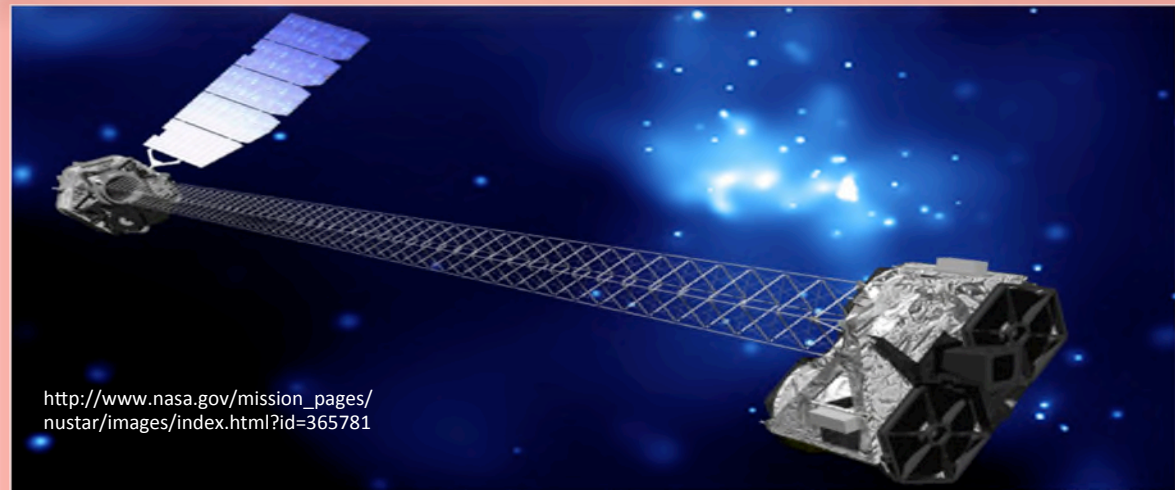
Larry Fineberg

NuSTAR Integration Engineer

Mission Integration Branch

Expendable Launch Vehicles

NASA Launch Services Program





Agenda

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- NuSTAR's mission
- Discoveries To-Date
- Mission's Current Status
- NuSTAR Launch Campaign
- NuSTAR Post Separation from Pegasus
- Questions?



NuSTAR's mission

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- NASA's Nuclear Spectroscopic Telescope Array (NuSTAR) is the first focusing high-energy X-ray mission
- Studies the hottest, densest, most energetic phenomena in the Universe
- Purpose is to search for black holes, map the remnants of stellar explosions, and study the most extreme active galaxies

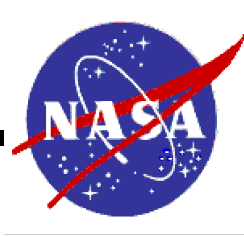


NuSTAR Discoveries To-Date

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The screenshot displays the NuSTAR NASA website interface. At the top is the NASA logo. Below it is a navigation bar with links: Topics, Missions, Galleries, NASA TV, Follow NASA, Downloads, About, and NASA Audiences. A search bar is located on the right. Below the navigation bar is a sub-navigation bar with links: NuSTAR, Overview, Images, Videos, and Media Resources. The main content area features a grid of images and data. The first row includes a large image of a galaxy cluster, a spiral galaxy, two images of a black hole accretion disk, and a close-up of a celestial body. The second row includes an image of the NuSTAR satellite, a graph titled 'NuSTAR Sees Titanium Glow in Supernova 1987A' showing a brightness spectrum with a peak at 4.5 keV, an image of a supernova remnant, and an image of a galaxy. The third row includes an image of a galaxy, an image of a black hole accretion disk, a graph titled 'Observed Mass Ranges of Compact Objects' showing mass ranges for black holes and neutron stars, and an image of a celestial body.

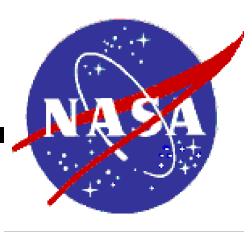
http://www.nasa.gov/mission_pages/NuStar/images/index.html



NuSTAR's Current Status

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- Completed its two-year Primary mission
 - Map selected regions of the sky
 - Take a census of collapsed stars and black holes of different sizes by surveying regions surrounding the center of our Milky Way Galaxy and performing deep observations of the extragalactic sky
 - Map recently-synthesized material in young supernova remnants to understand how stars explode and how elements are created
 - Understand what powers relativistic jets of particles from the most extreme active galaxies hosting supermassive black holes
- Now in an extended mission phase
 - Continue studies of X-Ray sources in the sky
 - Guest Observer program gives scientists worldwide observation time on the spacecraft



NuSTAR Launch Campaign

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- The NuSTAR observatory was assembled and tested at the Orbital Sciences facility in Virginia
- The Pegasus rocket components are assembled and tested at various locations around the country. About six months before launch all of the components are shipped to Orbital's Pegasus assembly and checkout facility at Vandenberg Air Force Base (located midway between L.A. and San Francisco)
- About 3 months before launch NuSTAR was shipped to Vandenberg
- About one month before launch NuSTAR was attached to the Pegasus rocket and the fairing is installed
- Between one & two weeks before launch the integrated rocket is attached to the L1011 aircraft (Stargazer) and ferried to the Reagan Test Site (RTS) located at Kwajalein Island

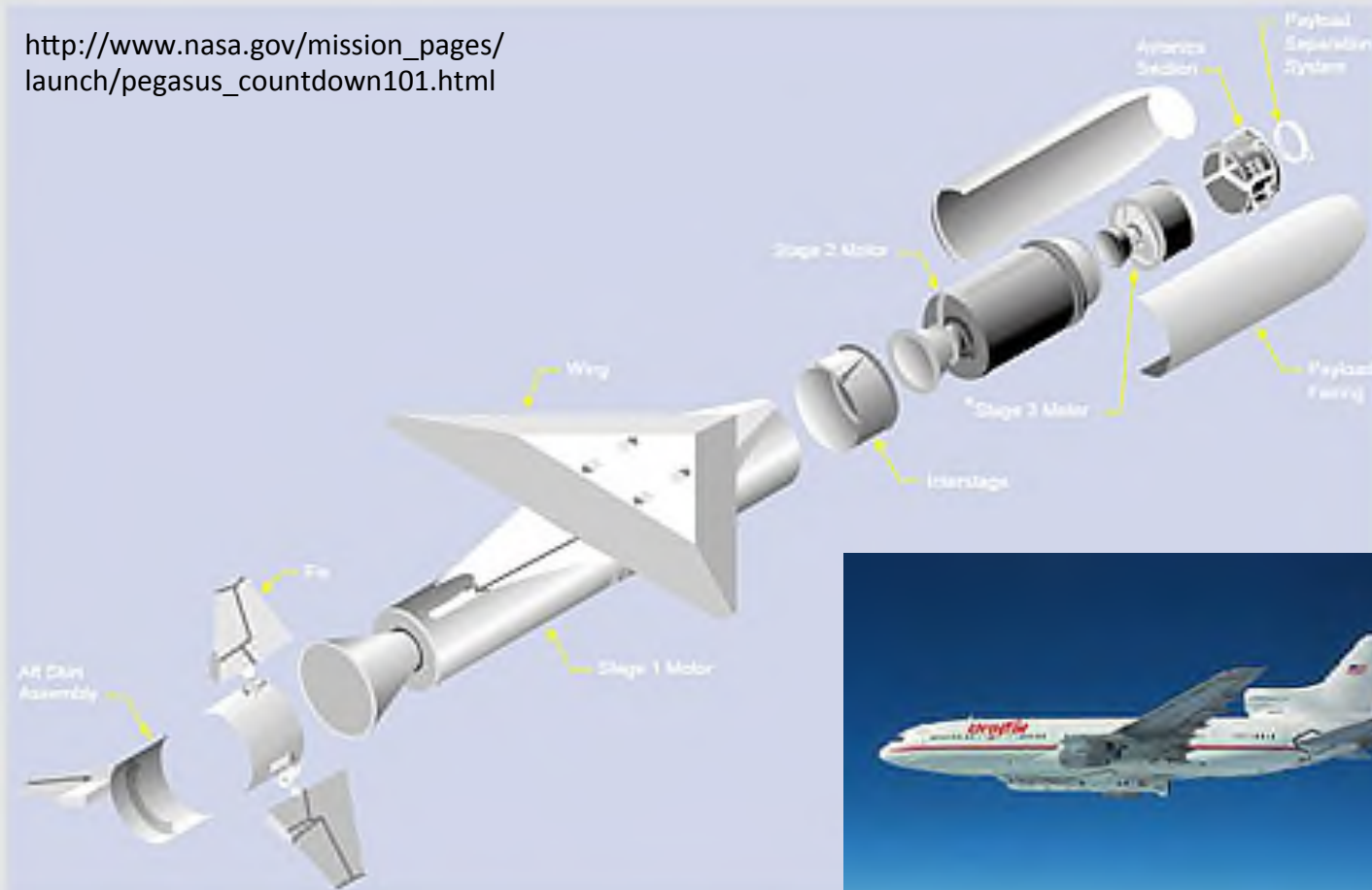


NuSTAR Launch Campaign

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Diagram of a Pegasus Rocket

http://www.nasa.gov/mission_pages/launch/pegasus_countdown101.html



http://www.nasa.gov/mission_pages/launch/pegasus_countdown101.html

Image credit: Orbital Sciences Corporation



NuSTAR Launch Campaign

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http://www.nasa.gov/mission_pages/nustar/multimedia/gallery/gallery-index.html



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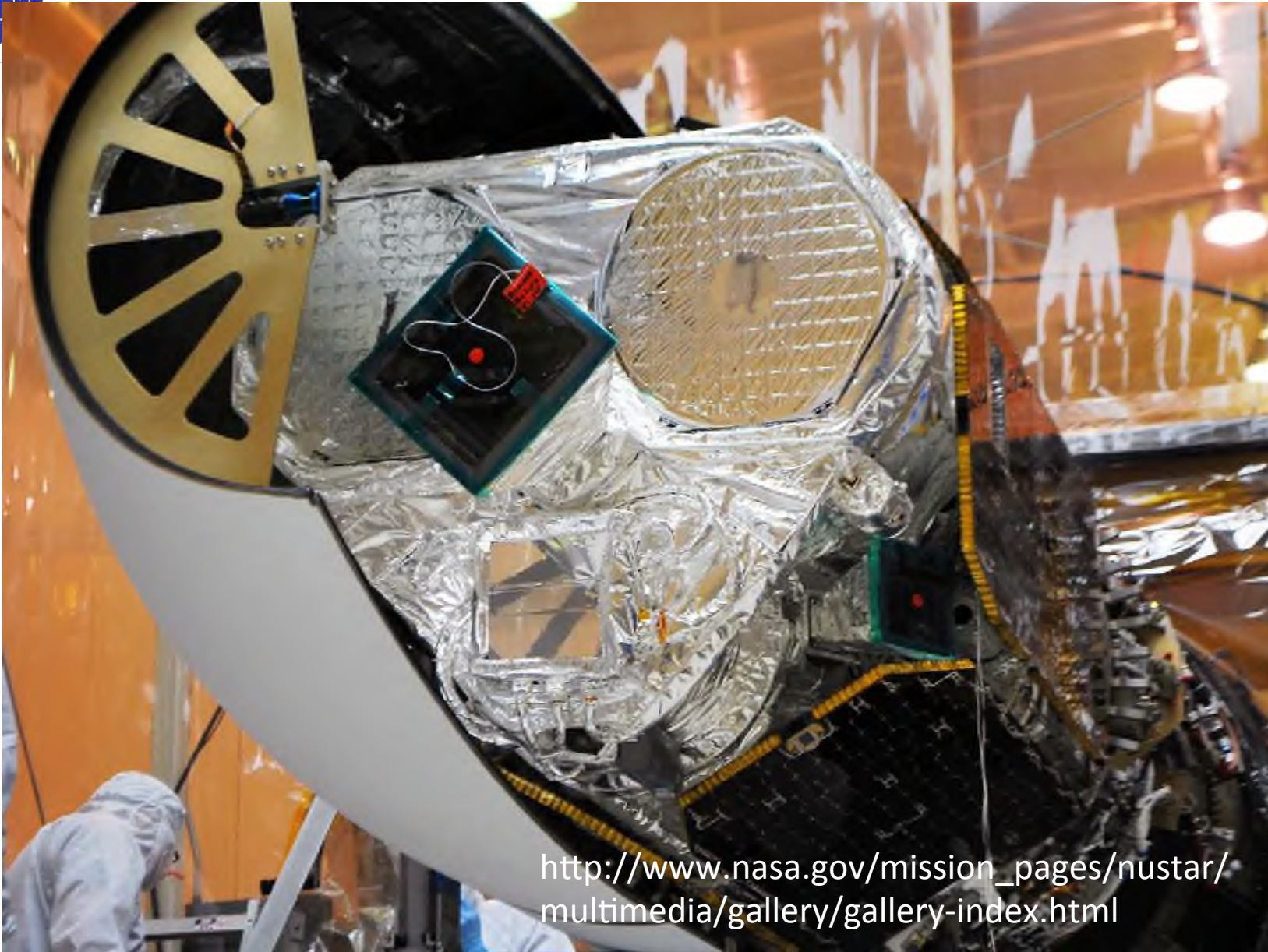
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NuSTAR Launch Campaign

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- Two days after departing from Vanddenberg AFB, the L1011 (with Pegasus rocket) landed at the Reagan Test Site, Kwajalein Island (Atoll), Marshall Islands
 - Located 2400 miles west of Hawaii & 1500 miles east of Guam
 - 9° north of the equator
 - Basically in the “Middle Of Nowhere”



NuSTAR Launch Campaign

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- After about a week of processing at Kwajalein, on June 13th 2012, shortly after midnight, the L1011 took off and flew southeastward to about 6 degrees latitude and released the Pegasus.
- About 10 seconds later, the first stage of Pegasus ignited



- About 10 minutes later, NuSTAR was separated from the remaining stage of the Pegasus rocket



Ok, so where is Kwajalein Island?

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Reagan Test Site, Kwajalein Island (Atoll), Marshall Islands

Located 2400 miles west of Hawaii & 1500 miles east of Guam

9° north of the equator

Basically in the “Middle Of Nowhere”





Ok, so where is Kwajalein Island?

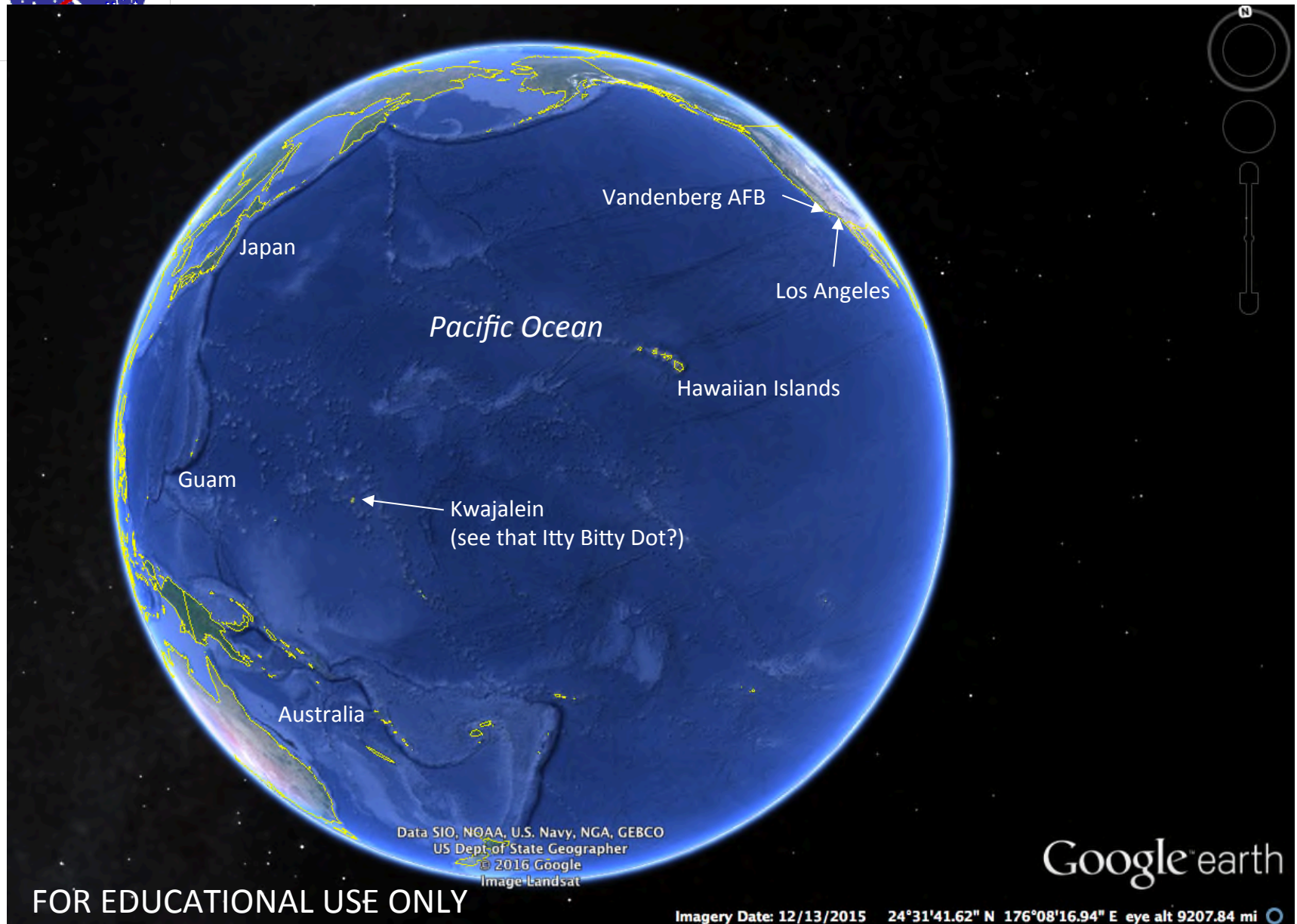
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Ok, so where is Kwajalein Island?

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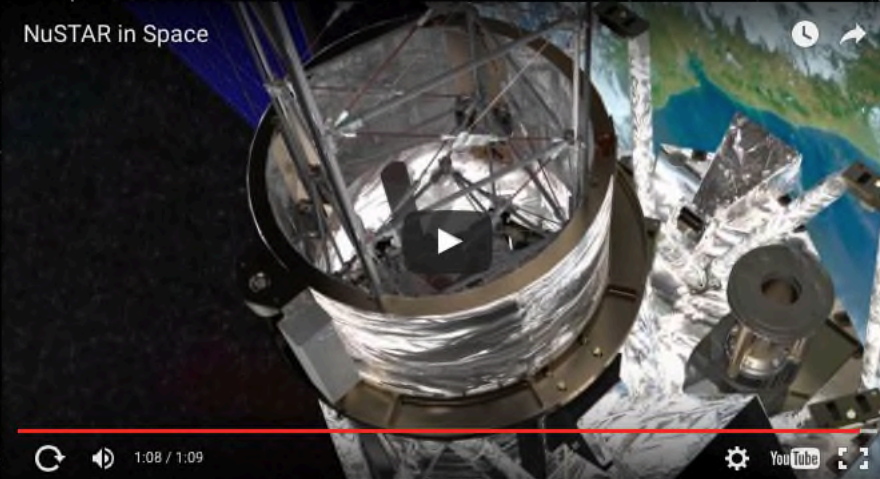


NuSTAR Post Separation from Pegasus

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NuSTAR Videos

NuSTAR in Space



NuSTAR in Space

NASA's newest X-

Close X

ray telescope will have a lengthy structure that unfolds in space, allowing it to see high-energy objects like feeding black holes.

http://www.nasa.gov/mission_pages/nustar/videos/index.html

Questions?

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